FINGER LAKES VINEYARD NOTES

Newsletter 1 January 19, 2001

Cornell Cooperative Extension

Finger Lakes Grape Program

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CONVENTION AND NEW GROWER WORKSHOP UPDATE

Timothy E. Martinson

Most of you should have received a program and registration form for the 52nd Annual Finger Lakes Grape Grower's Convention to be held at the Waterloo Holiday Inn. Briefly, the convention this year will actually be two meetings held back to back, with separate registration.

New Grower Workshop, March 2: We organized this program with Steve McKay, of the Hudson Valley Regional Fruit Program, in response to strong continuing interest and inquiries about starting vineyards and wineries– both in the Finger Lakes and in the Hudson Valley, as well as other parts of the state. It's designed to take new growers through the entire process of becoming a grape grower, from the initial financial planning through site selection, variety selection, vineyard design, on to planting, training and early care of vineyards. The binder included in the registration fee contains extension bulletins and other written material to supplement the talks. The wine reception and 'grazing' dinner will provide a chance to taste a representative variety of New York wines.

Convention and Trade Show, March 3: After last year's Viticulture 2000 in Buffalo, this year the convention returns to Waterloo, and will focus on some of the traditional topics. We will again have updates on disease and insect management, spray technology, and Concord physiology & management. Pending new variety releases from the breeding program will be described, and a comprehensive guide to V. *vinifera* clones will be presented. Hugh Fraser from Canada will discuss intensive alternate and every-row drainage tiling used extensively there. Finally, the meeting will end with a focus on contracts. Changing NY legal requirements on prompt payment have affected growers and processors this year. The need for increased quality and stable supply is affecting small wineries and growers. Are long-term contracts the answer? Examples from other regions will be presented. The trade show is almost sold out at this time, and will include several outdoor equipment exhibits.

The entire program is posted at our web site (www.cce.cornell.edu/programs/finger-lakes-grape). The Holiday Inn is offering a special conference rate of $63 per night (not $69 as previously listed) , for early booking up until February 9, 2001.

Question box. This year we will again have the question box, a half-hour session where speakers and others address questions asked by YOU. You can submit questions to us in writing before the meeting, send them to me by e-mail at tem2@cornell.edu, or submit them through our web site (see web address above).

See you at the convention!

WINTER BUDS: CONSTRUCTION AND POTENTIAL IMPACT FOR 2001

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Department of Horticultural Sciences
NYSAES, Geneva, NY 14456

Growers at this time of the year begin to concern themselves with looking ahead. They recognize that the past condition and treatment of their vines will impact next year's vegetative and reproductive development. A significant fact is that the new shoots and developing clusters of 2001 have already gotten their start within the overwintering buds now distributed over the canes in the vineyard. Choices have to be made, especially if hand pruning, about which of these buds to leave. Are the buds well "matured" and cold hardy? Do they contain well-developed embryonic leaves and clusters to start the new season? And, are the canes and buds endowed with adequate overwintered reserves to jump-start the development of leaf area and flowers after bud break?

The winter bud is essentially a miniaturized, resting flowering shoot that is lying dormant within some bud scales. Figure 1 depicts the relationship of the parts within the bud and the general organization of the grapevine node in winter. In the best scenario, the main component of the bud, the primary bud, will emerge in spring and produce a leafy shoot with several well-developed flowering clusters. However, all buds are not created equal. Indeed, we often find that buds on a cane, on a cordon, or on an entire vine are poorly developed. Often such buds are the result of poor environmental conditions at critical times during the season. However, vineyard practices also impact bud development through their influence on numbers of shoots and buds produced, amount of shading during cluster initiation, amount of crop to be supported by available leaf area, allocation of carbohydrates during fruit ripening and post-harvest periods, etc.

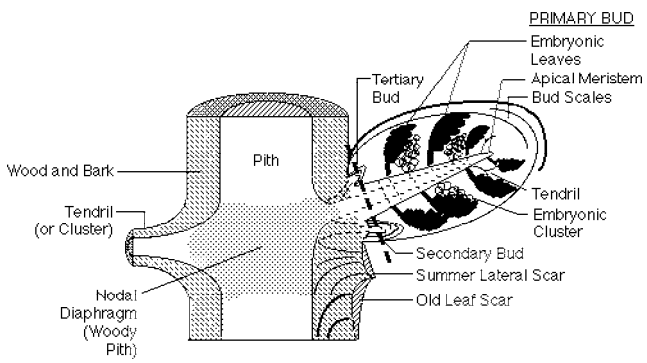

Figure 1. *Diagram of a vertical section through the typical node of a Concord cane and overwintering bud. The primary bud usually develops in spring and grows into a leafy shoot bearing a variable number of flowering clusters. The smaller secondary bud may emerge with the primary bud, or the secondary may become the only new shoot if the primary is killed by cold or another agent. Such a shoot is not as productive and may have no clusters. Cold injury to the bud complex (that is, primary, secondary and tertiary buds) is assessed by cutting buds across their bases (dashed line) and assessing tissue discoloration after buds are warmed a couple of days.*

The cooler overcast weather experienced this past growing season has certainly raised the question, "How well developed are the buds for next season?" After all, many sites have experienced only a short, or no, post-harvest period before a killing frost, so growers also worry about the vine's ability to develop adequate supplies of carbohydrate reserves for use during pre-bloom shoot growth next year.

In 2000, the buds in the fruiting zone of the shoot began developing clusters for next year sometime around bloom and completed development before the end of August. Therefore, we would expect that most of the buds we will leave after pruning this winter are going to be the most developed buds on the vines, that is, from nodes 1 to 10. Studies I have done over many years show that all buds surviving winter will have clusters that have developed enough to produce flowers. It is also clear that vines stressed by overcropping will develop smaller clusters with fewer branches and fewer flowers than less stressed vines. For example, in one of our experiments, minimal pruned vines that were stressed late in the summer by defoliation had significantly less developed clusters than did non-defoliated vines, which in turn had less developed clusters than did vines having the crop removed in July. Balance pruned vines typically show good cluster development in buds every year. Nevertheless, buds of all of our treatments have shown evidence this year of decreased differentiation of embryonic clusters and leaves, when compared to buds on these same vines over the last several years or to vines in other experimental blocks at the Fredonia Viticulture Lab or at the Geneva experiment station. The poor weather during the most critical phases of bud development likely had a major impact on bud "maturity" this past season.

In vines that have more limited carbohydrate reserves, flowers in emerging clusters may not develop fully in the pre-bloom period, they might abort a couple weeks before bloom, or may make it to bloom but not set fruit. Our studies at the Fredonia Lab in 1999 showed that the vines most stressed by overcropping in relation to available leaf area began and ended the season with the lowest reserves of carbohydrate. Although reserve carbohydrates in canes reached their lowest seasonal levels in all treatments at about bloom time, non-stressed vines were able to rapidly increase reserves during the time of fruit set and thereafter. The flowering-to-fruit set period is an extra stressful time for unbalanced vines in that current flowering and fruit set must compete with shoot tip growth and the initiation of clusters inside the new buds. When reserves are already low, something has got to give and often it is the reproductive process that is abandoned in favor of continued vegetative growth.

In many cases, vines expected to be in an "off year" (non-bearing year) next season might still have produced buds with good cluster development the previous summer-fall. Such clusters simply fail to reach their potential after bud break, often in situations where carbohydrate reserves constrain the proportion of flowers that the vine can bring to the bloom period. One surprise seen in my investigations this past season was that even undercropped, minimal pruned and balance pruned vines showed a lot of embryonic flowers aborting from clusters, from 3 weeks before bloom onward. We don't yet know if this is a common process that occurs every year, as no one has reported it before. Nor do we know whether our experimental vineyard blocks were somehow not representative of the typical grower's vineyard, or if 2000's weather was so cool, overcast and wet as to cause this high rate of flower abortion.

We have all heard that canopy shade can inhibit bud development and maturation. To examine this issue, early in December 2000 I dissected buds of Concord vines that had been either balance pruned or pruned to 100 nodes for several years at the Viticulture Lab in Fredonia. One group of buds came from nodes 1 to 10 on well exposed canes expected to be left after pruning this winter, and another group of buds came from nodes 1 to 10 on canes that should be pruned out because they grew in canopy shade. Both exposed and unexposed buds in both treatments had well-developed basal clusters in the overwintering primary buds (Stage 5 to 6, Fig. 2). The second cluster develops later than the first, yet it seemed to suffer little during development in shade, at least in the small sample taken. Cluster 2 had developed to Stage 3 to 5 (Fig. 2). The third cluster, which is usually the weakest, and which sometimes develops as a tendril, suffered most from being in the shaded canopy. Whereas cluster 3 in exposed buds had developed to Stage 3, it was not unusual to see them develop only to Stage 1 in the shade. The shaded buds also had fewer embryonic leaves inside of them, which means that the bud's vegetative development also suffered in the shade. It is also likely that the shaded canes would have had decreased reserves of carbohydrates, because shaded leaves "pump out" fewer sugars via photosynthesis. I should mention, however, that even the well-exposed buds appeared to have poorer leaf and cluster development than I have seen in previous years. This was especially true for the second and third cluster in the buds. Apparently, the growing conditions caused by weather this past season did indeed have an impact on bud development. The bottom line for pruners, which you have all heard before, is you should always attempt to leave canes and buds that had best exposure to light during the previous growing season. That is not easily done with some training systems, so the grower often makes compromises.

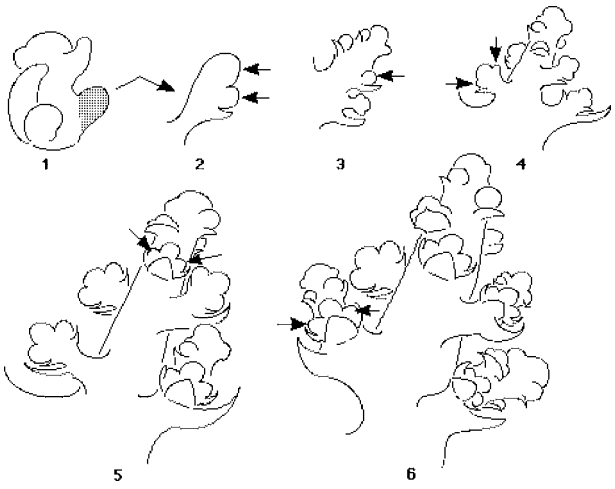

Figure 2. *The stages of development of clusters in primary buds of grapevines, from time of cluster initiation in June to time of winter dormancy in December. Stage 1 shows that the tip portion of the tiny primary bud has initiated a cluster (shaded part), and stages 2–6 show how this cluster increases in size and branching (arrows) before winter. Stage 6 is maximum development under good conditions. Note: there are no flowers produced before winter. The "bumps" shown may further branch after bud break and before individual flowers begin to develop from them.*

How much does temperature play a role in bud development? Apparently, it impacts heavily on both cluster development before winter and on flower production the next season. For example, we found in a 1992–1994 study that more developed clusters in winter buds were directly correlated with greater flower number on those clusters the following season (Fig. 3). Each plotted line in Fig. 3 includes data on all three clusters in the bud and also data from minimal pruned and balance pruned vines; nevertheless, all data in a given year essentially fall on the same plotted line. The slope of the plotted relationship was the same all three years; however, a cluster at a given winter stage could produce more or less flowers depending on year. Flower numbers increased in 1992, after a hot 1991; they decreased in 1993, after a cool overcast 1992; and they again increased in 1994 after a warm 1993. This is supported by data shown in Fig. 4, where average flower number per shoot is plotted against the accumulated growing-degree-days of the previous year, for both minimal pruned and balance pruned vines at the Fredonia Viticulture Lab. If the patterns for Figs. 3 and 4 hold, we would expect clusters in this year's overwintering buds to show the typical developmental range seen in these other studies, while flower numbers per shoot in 2001 will be somewhat below "average," whatever that is for your vines.

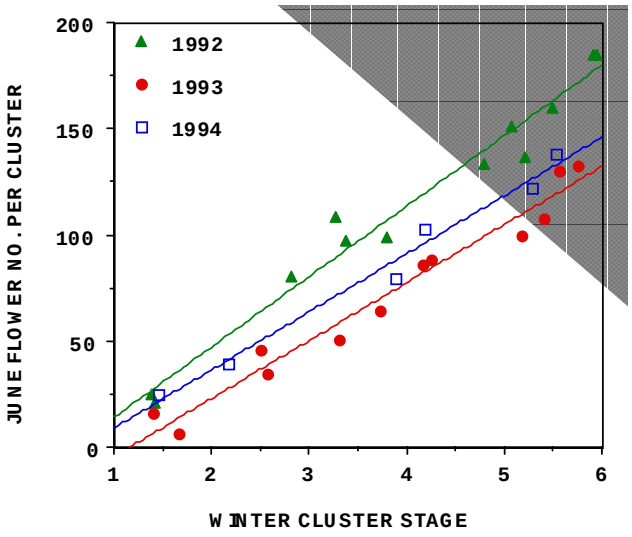

Figure 3. *The number of flowers produced on a cluster in June of 1992, 93, and 94 in relation to the developmental stage of that cluster in the overwintering bud the previous January. Each plotted point represents at least 10 clusters. Note plots have similar slopes but move up or down, depending on year.*

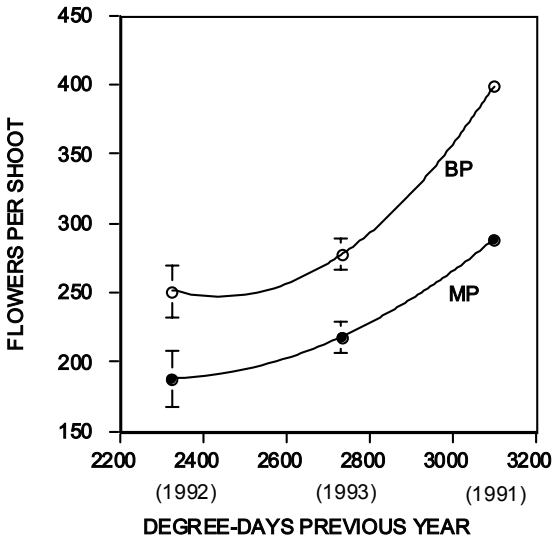

Figure 4. *Flowers counted per shoot in June of 1992, 93, and 94 in relation to the heat (growing-degree-days) accumulated the previous season (1991, 92, and 93, in parentheses), for minimal pruned and balance pruned vines at the Fredonia Viticulture Lab. High flower number follows warmer years. Although balance pruned vines have more flowers per shoot, they have a lot fewer shoots than do minimal pruned vines.*

From your own experience, you often see that, after a season of no or low crop, vines will "bounce back" with a normal or large crop the next season. This is in no small way due to the fact that the vine tends to have good shoot growth in "off" years, when photosynthesis can contribute large stores of carbohydrates to the production of well developed buds (if in sun-exposed parts of the canopy), a strong development of the woody parts of the vine, and abundant reserves for supporting spring growth the next season. The alternate-bearing situation becomes a "vicious cycle" that growers should strive to avoid by balancing crop size to vine size whenever possible, within the limitations of their pruning and training systems. While on the subject of strong vegetative growth, excessive growth can negatively impact cluster development in buds. In one study of Niagara vines that were accidentally over-fertilized with nitrogen by a Finger Lakes grower, I found that cluster formation in the developing buds was diminished in comparison to that of vines having the "normal" application of nitrogen. Such rank growth likely caused heavy shading and competition for sugars among the berries, the large number of growing shoot tips, and the many developing buds. In such situations bud development is constrained and cluster formation reduced. Consistent production of good yields while

maintaining optimal vine size and cane and bud maturity should be a goal every year. This may necessitate a revision of management practices, while keeping in mind the seasonal conditions for crop production in both the current and previous year.

Acknowledgement: Funding for much of these studies was provided by the Grape Production Research Fund, the Kaplan Fund, Lake Erie Regional Grape Production Fund, the New York Wine & Grape Foundation, and grants from the USDA Viticulture Consortium.

Cornell Researchers Use Seneca Army Depot to Improve Agricultural Sprayers and Reduce Pesticide Drift

Linda McCandless

ROMULUS, NY: The machine shop at the Seneca Army Depot in Romulus, NY, is 280' long, 54' wide, and 60' high-large enough to hold a football game, a missile, or a Ford New Holland tractor hooked to an airblast sprayer. During the Cold War, the facility was surrounded by chain-link fence and razor wire, heavily guarded and off-limits to the local community. Army engineers used the shop to work on munitions and tanks. Their goal was political: to fight Communism. Post-Cold-War, agricultural engineers at Cornell University are using the space to test airblast sprayers that fight insects and diseases. Their goal is an environmentally friendly one: reduce pesticide drift.

"Inefficient spray technologies result in an over-use of pesticides and/or a reduction in pest control, both of which cost growers significant amounts of money," says Wayne Wilcox, Cornell University professor of fruit diseases in the department of plant pathology at the New York State Agricultural Experiment Station in Geneva, NY. "They can also result in unnecessary and avoidable levels of environmental pollution and spray applicator exposure to pesticides."

Wilcox evaluates spray deposition and its effect on pest control for several new spray technologies with Andrew Landers, an agricultural engineer and pesticide application technology specialist from Cornell's Ithaca campus. The standard airblast sprayer costs $5,000-$35,000. They are used by 99 percent of apple and grape growers worldwide to apply pesticides.

Landers, a Brit who is long on humor and short on patience with technological inefficiencies, has worked with sprayers in Europe and the U.S. for 30 years. He came to Cornell three years ago from Cranfield University. He manages cooperative projects with grape, apple, vegetable and turfgrass growers in Riverhead, Plattsburg, Fredonia, Ithaca, and Geneva.

At the cavernous machine shop at the army depot in Romulus, Landers set up the 'Jean Machine' developed in his lab. The machine, which provides a visual and measurable demonstration of air flow, was designed to fit in the back of a Plymouth minivan so it could be used for demonstration purposes at grower meetings. It is made of PVC pipe, placed vertically at 4 1/2' intervals, strung netlike with 20 lb. test fishing line, on which is hung 8" seam binding at regular intervals. Wind patterns are also shown via neutrally buoyant helium bubbles. A hot wire anemometer measures wind speed data. Data is used to construct contour graphs to compare modifications to the sprayer. "When we turn on the airblast sprayer and run it without liquid, we can see the airflow characteristics via the 'Jean Machine' and the helium bubbles and measure it with the hot wire anemometer," said Landers.

In the grape industry, for instance, grape canopies are 6'6" high, in rows that are generally 9' apart. "We have measured the deposition of some sprayers that are shooting pesticides 20' into the air-clearly beyond the usable range. Our goal is to control drift by developing better deflection technology and then educate grower to use the 'fix' we develop," said Landers.

Generating and testing data was much more complicated than the solution which is not expensive. Landers and his colleagues at Cornell developed deflectors made from readily-available sheet metal. "They are six to eight times longer than the ones that come with the sprayers from the factory," said Landers. "Then, we adjusted deflector length, the angle of deflection, and added a metal plate to the front of the deflector to prevent spray from shooting forward."

Using the new improved model, Landers estimates growers can increase spray efficiency by 50 percent. That, and the fact that the 'fix' can be made for less

than $100 are the two messages he will deliver to growers throughout the Northeast in winter meetings.

"Growers in the Finger Lakes may spend from $100-$300/acre on fungicide and insecticide sprays," says Tim Martinson, who is the extension educator at the Finger Lakes Grape Program in Penn Yan. "The majority are fungicide sprays to control four major diseases of grapes. With improved deposition, growers might be able to reduce rates and save on their spray bill. More importantly, this simple deflector will improve disease control, while preventing these expensive fungicides from being blown off into the air and landing where they aren't wanted. It's hard to imagine another simple fix that would offer as many benefits to the grower."

The Spirit of Cooperation

Cooperation between specialists in pest management biology and agricultural engineering is surprisingly rare.

"Engineers and biologists come from somewhat different cultures, and often work within their own professional universes," says Wilcox. "I have not seen anything remotely approaching this level of cooperation between these two 'groups' in my nearly 17 years here at Cornell."

He explains how the interaction between engineers and biologists works. "A considerable portion of my program is devoted to devising spray programs of maximum efficiency, i.e., with respect to the choice of materials, rates, and timings that will provide commercial levels of control with a minimum input of spray material and labor," says Wilcox. "However, these programs will not perform as they are designed to if the materials are not delivered adequately and safely to the fruit and foliage of the crops. Thus, I work on the 'what' and 'when' of spray programs, whereas Andrew works on the 'how'. A weak link in any part of this 'chain' will defeat our common objective of providing safe and efficient pest control programs."

On his part, Landers is enthused about the level of cooperation with the company that has bought the Depot. To test the technology, he needed indoor space large enough so the turbulence generated by sprayers would not 'bounce back' and compromise the testing limits of his equipment. "I would really like to thank the Advantage Group out of Bethesda, MD, for making this testing space available to us," said Landers. "They bought this abandoned depot intending to develop it as a leading distribution center for the Finger Lakes. Their director, Pete Gorski, was willing to give me this space for our spray tests. This project is a good example of developers working with the local community."

GRAPE RESEARCH ROUNDTABLE INVITATION

Thomas Davenport
National Grape Cooperative

All interested grape growers are invited to attend a meeting at the Days Inn located in Fredonia, NY on February 9, 2001. The Days Inn is located at 10455 Bennett Road(Rte 60) just South of the Fredonia/Dunkirk exit 59 off the Thruway. You are invited to participate in a roundtable review and discussion on ongoing or proposed viticulture research projects. These are projects funded by New York Wine & Grape Foundation, Lake Erie Regional Grape Processors, the Grape Production Research Fund and/or the Viticulture Consortium. This meeting will begin at 10:00AM and conclude by 5:00PM.

This is an excellent opportunity for growers to learn more about and participate in the direction of research being conducted in New York and Pennsylvania on behalf of the industry. These roundtable discussions will focus on three subject areas: (1) Optimizing Plant Protection; (2) Genetic Improvement of Grapes; and (3) Improving Production Practices. Lunch will be provided, but we need to know the number of participants, so please let Linda Aures at 716-672-5296, email laures@netsync.net or for those of you in the Finger Lakes Katie Tomlinson at 315-536-5134, email mct11@cornell.edu know if you will be attending.

PESTICIDE TRAINING AND RECERTIFICATION SERIES

Upcoming Pesticide Training and Recertification classes offered by Cornell Cooperative Extension. These will be offered in he following locations:

Presbyterian Church
211 Main Street, **Penn Yan**
February 1, 8, 15, 22, 2001
1:00 - 3:30 pm
Exam, March 1st, 1:00 - 4:30 pm

Cooperative Extension Center
249 Highland Avenue, **Rochester**
February 2, 9, 16, 23, 2001
1:00 - 3:30 pm
Exam, March 2nd, 1:00 - 4:30 pm

Cooperative Extension Center
480 North Main Street, **Canandaigua**
March 5, 9, 19, 23, 2001
7:00 - 9:30 pm
Exam, April 2nd, 7:00 - 10:30 pm

Romulus Fire Hall
Cayuga Road, **Romulus**
March 8, 15, 22, 29, 2001
1:00 - 3:30 pm
Exam, April 5th, 1:00 - 4:30 pm

Cost for all sessions is $75.00 including training manuals. Certified applicators seeking recertification can receive 2.5 credits per class. Cost for all classes is $45 (without manuals, test) or $15 for individual classes. Registration forms are available through our office, or contact:

Russell Wesler
Extension Educator, Pesticides
Cornell Cooperative Extension of Ontario County
716.394.0377
Email rw43@cornell.edu

UPCOMING EVENTS

Unified Wine and Grape Symposium. January 23 - 25, 2001. Sacramento Convention Center, Sacramento, California. Contact ASEV, PO Box 1855, Davis, CA 95617-1855, 530.753.3142, Fax 530.753.3318, society@asev.org or http://www.unifiedsymposium.org

Employee Management Seminar. January 24 & 31, 2001. Farm Credit Office, Route 14, Phelps, NY. This seminar will improve your skills in writing job descriptions, recruiting, interviewing and performance management. Proven leadership styles, motivation techniques and training programs that improve employee productivity will be discussed. Contact Farm Credit of WNY, 800.929.7102 for more information. http://www.farmcreditwny.com

Lake Erie Regional Grape Growers Convention. February 10, 2001. Northeast, PA. Annual winter meeting of the Lake Erie Regional Grape Program. Note the change in date and location. Call 716.672.2191 for more information. http://lenewa.netsync.net/public/lergphom.htm

Ohio Grape/Wine Shortcourse "The Path to Gold." February 18 - 20, 2001. Wyndham Dublin Hotel, Dublin, OH. Program includes enology workshops, viticulture seminars, marketing programs, nationally known speakers, expanded trade show, tastings, banquet and fun! For more information contact Ohio Wines from the Heartland at 440.466.4417 or 800.227.6972.

Niagara Peninsula Fruit and Veg Growers' Association Convention. February 21 - 21, 2001. Brock University, St. Catharines. Contact Ken Slingerland, Ontario Ministry of Agriculture, Food and Rural Affairs at 905-562-4147

52nd Annual Finger Lakes Grape Growers Convention. March 2 - 3, 2001. Waterloo Holiday Inn, Waterloo, NY. The convention returns to Waterloo. This year it will feature a half-day session on Friday afternoon, March 2, aimed at "New Growers." Look for details in upcoming Vineyard Notes. Call 315.536.5134 for more information.

Fourth Annual Cornell Vinification & Brewing Technology Laboratory Gala Dinner and Wine Auction. March 9, 2001. Casa Larga Vineyards, Fairport NY contact: Nancy Long (npl1@cornell.edu, ph: 315-787-2288, fax: 315-787-2284) http://www.nysaes.cornell.edu/fst/vb/

Grape Expectations - A Viticultural and Enological Symposium. March 10, 2001. Forsgate Country Clubl, Jamesburg, NJ. For more information contact Dr. Joseph Fiola, Rutgers Fruit R & E Center, 283 Route 539, Cream Ridge, NJ 08514, call 609.758.7311 or email creamridge@aesop.rutgers.edu

Wineries Unlimited. March 20-23. Lancaster, PA. This will be the 25th annual trade show and seminar, organized by Vineyard and Winery Management. Call 800.535.5670 for more information. http://www.vwm-online.com

New York Wine Industry Workshop. April 4 - 6, 2001. Lake Front Ramada Inn, Geneva NY. Contact Nancy Long for more information at npl1@cornell.edu or phone 315-787-2288 or fax 315-787-2284.

Cornell Cooperative Extension

Finger Lakes Grape Program

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FINGER LAKES VINEYARD NOTES

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